

## CLAIMS

1. Superconducting cable comprising at least one layer of tapes of superconducting material circumferentially wound side by side on a support at a prefixed distance so as gaps are circumferentially formed among adjacent tapes, wherein non-superconducting material in a shape of selected from wires and tapes, is interposed between adjacent tapes to partially fill said gaps.
2. Superconducting cable according to claim 1 comprising a phase conductor including at least a first layer of tapes of superconducting material circumferentially wound side by side on a support at a prefixed distance so as gaps are circumferentially formed among adjacent tapes, and a return conductor including at least a second layer of tapes of superconducting material, as return conductor circumferentially wound on a support side by side at a prefixed distance so as gaps are circumferentially formed among adjacent tapes, wherein the non-superconducting material is present among the tapes of superconducting material of the return conductor.
3. Superconducting cable according to claim 2 wherein the non-superconducting material among the tapes of superconducting material of both the phase and return conductor.
4. Superconducting cable according to claim 1 wherein the non-superconducting material is in form of tapes.
5. Superconducting cable according to claim 1 wherein the non-superconducting material has a thickness differing from that of the tapes of the superconducting material of an amount not higher than  $\pm 15\%$ .
6. Superconducting cable according to claim 6 wherein the non-superconducting material has a thickness differing from that of the tapes of the superconducting material of an amount not higher than  $\pm 10\%$ .
7. Superconducting cable according to claim 7 wherein the non-superconducting material has a thickness differing from that of the tapes of the superconducting material of an amount not higher than  $\pm 5\%$ .

8. Superconducting cable according to claim 8 wherein the non-superconducting material has a thickness substantially equal to that of the tapes of the superconducting material.
9. Superconducting cable according to claim 1 wherein the width of the non-superconducting material is such that a gap of 0.1-3 mm remains between a tape of superconducting material and the adjacent non-superconducting material.
10. Superconducting cable according to claim 9 wherein the remaining gap is of 0.1-2 mm.
11. Superconducting cable according to claim 1 wherein the non-superconducting material is of plastic, metal or a combination thereof.
12. Superconducting cable according to claim 11 wherein the metal has amagnetic characteristics at the operative temperature.
13. Superconducting cable according to claim 12 wherein the metal is copper, silver, and gold or alloys thereof.
14. Superconducting cable according to claim 13 wherein the metal is copper.
15. Superconducting cable according to claim 1 wherein the non-superconducting material is longitudinally wound on the support or on the underlying superconducting layer, and alternated with the tapes of superconducting material.
16. Method for minimizing mechanical stresses to tapes of superconducting material circumferentially wound side by side on a support at a prefixed distance so as gaps are circumferentially formed among adjacent tapes, comprising the phase of interposing a non-superconducting material in a shape of selected from wires and tapes between adjacent tapes to partially fill said gaps.
17. Method for producing a superconducting conductor comprising at least one layer of superconducting tapes circumferentially wound side by side on a support at a prefixed distance so as gaps are circumferentially formed among adjacent tapes, wherein a non-superconducting material in a shape of selected from wires and tapes is interposed between adjacent tapes to partially fill said gaps.

18. Current transmission/distribution network comprising at least one superconducting cable comprising at least one layer of tapes of superconducting material circumferentially wound side by side on a support at a prefixed distance such as gaps are formed among the tapes, wherein a non-superconducting material in a shape of selected from wires and tapes is interposed between adjacent tapes to partially fill said gaps.

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